

**HR 3741 INFORMATIONAL SHEET WITH REGARDS TO THE PROPOSED
ACT AUTHORIZING THE TOWN OF ORLEANS TO ENTER INTO CONTRACTS
FOR A SEWER WORKS SYSTEM AND OPERATION**

▪ **WWTF Size, Location (gpd), General Design, Site Size and Ownership**

The Town of Orleans proposes to construct a new wastewater treatment facility (WWTF) at the site of the existing Tri-Town Septage Treatment Facility located at 20 - 29 Overland Way in Orleans, MA. Approximately 3.5 acres of the 26 acre has been previously developed. Upon demolition of the Tri-Town Septage Treatment Facility schedule from September 2017 through April 2018, the Town of Orleans will take over ownership of the property.

The WWTF will be designed to remove conventional pollutants (BOD and TSS) and to significantly reduce the amount of total nitrogen levels in the effluent prior to groundwater discharge. The following is a summary of the major proposed treatment components:

- Administration/Laboratory Building with Septage Receiving Truck Bay;
- Covered Headworks with Influent Micro Screening with manual bar rack by-pass;
- Flow Equalization and Flow Splitting;
- Sequencing Batch Reactor Tanks;
- Process Building housing post-SBR filters and SBR blowers;
- Post Equalization Tank (Effluent Pump Station);
- Ultraviolet disinfection units providing final treatment prior to disposal via groundwater discharge;
- Effluent Sampling and Flow Measurement;
- WWTF effluent piping to groundwater discharge site(s);
- Sludge holding tanks, Sludge thickener, thickened sludge holding tank, and sludge load-out station; and
- Odor control to treat odorous air from the headworks, equalization tank, and sludge holding tanks.

The major process equipment at the WWTF is as shown in the following table.

Major Process Equipment	Description (Duty/Rating/Capacity)	Quantity	Design Basis
Preliminary Screening – 6 mm	0.60 MGD	1 Duty; 1 Future; 1 Manual Bar rack by-pass	Hydro Dyn Engineering Model# CF23-12-73-6-P
Equalization Tank	150,000 gal tanks (35' x 34' x 18')	2	N/A
Equalization Transfer Pump	210 gpm at 40' TDH	2 Duty; 1 Standby; 2 Future	Sulzer/ABS Model XFP 100E-CB1 PE56/4
SBR Reactor Tanks	229,000 gal tanks (35' x 35' x 25')	2	Aqua-Aerobic Systems, Inc. AquaSBR
Disk Filters (post-SBR)	815 gpm	2	Aqua-Aerobic Systems, Inc. AquaDisk
Post-Equalization Tank	55,000 gal (34' x 12' x 18')	1 Duty	N/A
Effluent Discharge Pumps	210 gpm at 135' TDH	2 Duty; 1 Standby; 2 Future	Sulzer/ABS Model XFP 101G-CB1 PE185/2
UV	0.60 MGD; Minimum dose: >29	1 Duty; 1 Standby 16 maps each	WEDECO LBX series

Major Process Equipment	Description (Duty/Rating/Capacity)	Quantity	Design Basis
Septage Receiving	mJ/cm ² 700 gpm at 3% D.S.	1 Duty	HUBER Sludge Acceptance Plant Model: RoFAS1
Sludge Thickening	89 gpm at 0.52% sludge concentration	1 Duty	HUBER S-Disc Size 1 Disk Thickener
Odor Control - Biofilter	12,170 cfm 40' x 25' x 6.1'	1 Duty	Biorem Technologies Inc. Modular Biofilter System
Coarse Bubble Diffusers	Equalization Tank: 380 scfm WAS Tank: 475 scfm TWAS Tank: 630 scfm	Equalization Tank: 36 diffusers in 2 grids WAS Tank: 40 diffusers in 2 grids TWAS Tank: 128 diffusers in 2 grids	Aquarius Stainless Coarse Bubble Diffused Aeration
Mixing Blowers	250 scfm at 7.1 psi 650 scfm at 7.1 psi	4 Duty 1 Duty; 1 Standby	Aerzen Rotary Lobe Blower GM 10 S, LU 43.01; Aerzen Rotary Lobe Blower GM 25 S, LU 43.01;

The WWTF will be constructed in two phases based of wastewater flows received from the two services areas and is as shown in the following table.

Area	Future Wastewater Flow (with Build-out) Annual Average (gpd)
WWTF – Phase 1	186,300
Downtown – Phase 1	59,300
Downtown – Phase 2	50,300
Meetinghouse Pond-Phase 1	48,300
Downtown I/I (Phases 1 and 2)	8,400
Meetinghouse Pond I/I (Phase 1)	4,000
Septage	16,000
WWTF Total – Phase 1	163,200
WWTF – Phase 2	
Downtown – Phase 3	76,100
Downtown – Phase 4	26,400
Meetinghouse Pond-Phase 2	48,300
Downtown I/I (Phases 3 and 4)	8,400
Meetinghouse Pond I/I (Phase 2)	4,000
WWTF Total -Phase 1 + Phase 2	349,500

▪ **Effluent Disposal Site Locations, Ownership and Size**

It is anticipated that effluent disposal from the WWTF will be disposed of at one or more location. The proposed groundwater discharge locations are shown in the following table.

Location	Estimated ADF Capacity (gpd)	Current Ownership	MassDEP Approved Groundwater Discharge Evaluation
Overland Way – Approved CWMP	700,000	Town	Yes
Overland Way – Site 1/1A	200,000	Town	No
Route 6 Interchange	500,000	MassDOT	No
Thayer Site	140,000	Private	Yes
Hubler Property (223 Beach Road)	200,000	Town	Yes

▪ **Estimated Cost: Capital and Operating**

The estimated capital, annual operation and maintenance, annual replacement and annual monitoring costs are shown on the following table.

Item	Estimated Costs			
	Capital	Annual O&M	Annual Replacement	Annual Monitoring
Traditional Technologies				
Collection System				
Downtown Area	\$22,800,400	\$220,500	\$32,700	\$8,900
Meetinghouse Pond Area	\$19,632,300	\$128,400	\$34,600	\$3,000
Wastewater Treatment Facility at Overland Way	\$23,023,700	\$606,300	\$143,500	\$16,900
Effluent Disposal – Overland Way, Site 1/1A and Route 6 Exit 12 Cloverleaf	\$3,891,000	\$17,000	\$0	\$32,200
Non-Traditional Technologies				
Nitrogen Removing Barriers	\$12,392,900	\$51,700	\$0	\$206,700
Aquaculture	\$3,037,900	\$450,800	\$221,100	\$291,500
Permeable Reactive Barriers	\$5,290,300	\$0	\$167,800	\$911,700
	\$90,068,500	\$1,474,700	\$599,700	\$1,470,900

- Number of customers to be served – The estimated number of customers to be served are shown in the following table.

Description	Number of Customers
Sewered Areas	
Downtown Area - Non-Residential	384
Downtown Area and Meetinghouse Pond Area - Residential	1,176
Unsewered Areas	
Nitrogen Sensitive Areas	4,208
Non-Nitrogen Sensitive Areas	791
Total	6,559

Planning and Design Status (Approved CWMP and ACWMP)

Background

The Town of Orleans (Town) prepared a Comprehensive Wastewater Management Plan (CWMP) and Single Environmental Impact Report (SEIR) in December 2010. The 2010 CWMP/SEIR proposed a new centralized sewer system to reduce nitrogen loads to coastal bays and estuaries in Orleans. The 2010 proposal included 74 miles of new sewer, 63 sewer pump stations, and a new wastewater treatment and groundwater disposal facility at the existing Tri-Town Septage Treatment Facility site, which would have treated up to 64 million gallons per day (MGD) of wastewater and discharged it to groundwater at the Tri-Town site. In addition, the 2010 CWMP/SEIR identified non-structural controls to further reduce nitrogen loading, including fertilizer use controls, stormwater management, land use controls, water conservation, and enhanced embayment flushing.

The Cape Cod Commission (CCC) held a joint hearing with the Massachusetts Environmental Policy Act (MEPA) staff on January 18, 2011 on the S/FEIR, and the CCC voted to submit comments to the Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA) for MEPA review. On January 28, 2011, the EOEEA issued a Certificate on the revised CWMP S/FEIR (Appendix A) stating that the project complied with MEPA, which started the clock for the CCC to hold a public hearing to review the project within 45 days of the certification. Several hearings were held, between March 1, through October 13, 2011 when the full CCC voted unanimously to approve the project and issued an approval for the project as a Development of Regional Impact (DRI) with conditions.

The Orleans CWMP DRI approval included conditions regarding the potential of operating the Orleans WWTF as a shared municipal facility, but also allowed Orleans to proceed with a single town plan if no agreement with the other Towns could be reached. The DRI decision also capped the amount of assimilative capacity in the Nauset Marsh system that Orleans could use through the WWTF discharge.

Since the CWMP was approved in 2011, the Town has allocated funds each year through the Town meeting process in order to advance the planning and implementation included in the document. Input from stakeholders has produced a variety of ideas regarding types and quantities of Traditional sewerage technologies to use and where they would be most appropriate and effective. In addition, these discussions have identified the potential for using Non-Traditional technologies to reduce nitrogen loads to receiving waters, and evaluated types and locations of Non-Traditional technologies. Several boards, subcommittees and working groups have met over the years with consulting firms to achieve consensus on a plan that would be approved by residents.

Cape Cod Commission 208 Plan Update Recommendations

In 2013, MassDEP directed the CCC to develop an update to the Water Quality Management Plan for the region in accordance with Section 208 of the federal Clean Water Act, due to the impairment of water quality in coastal waters as a result of excess nitrogen. The CCC issued the updated plan, and it was approved by MassDEP and US EPA in 2015. The 208 Plan Update identified a number of recommendations to improve water quality in coastal waters surrounding Cape Cod, which are designated into one of four categories: information; regulatory reform; support; or cost.

The 208 Plan Update recommended that the CCC implement the following measures regarding water quality information:

- Implement a regional monitoring program for performance and compliance monitoring;
- Provide a technical guidance document of monitoring protocols for Non-Traditional technologies;
- Create a standing monitoring committee;
- Develop a process for annual updates to the Technologies matrix;
- Seek to sponsor an annual symposium to present and review new research on technologies and approaches coinciding with the regular updates to the Technologies Matrix;
- Create a regional water quality data center;
- Continue cooperation with the Massachusetts Department of Transportation (MassDOT) regarding stormwater contributions as well as opportunities to improve tidal flushing in coastal areas and use rights-of-way for water quality improvement projects; and
- Evaluate the demands for septage processing and treatment.

The regulatory reform recommendations included:

- MEPA and the CCC should jointly develop a streamlined review procedure for review of targeted watershed management plans (TWMPs);
- Identification of requirements for TWMPs based on watershed boundaries;
- Reformation of the Development of Regional Impacts (DRI) process to a simpler, more supportive process;
- Review of local water quality management plans to ensure consistency with the Updated 208 Plan;
- Development of guidance on consistency review to be issued by the CCC;
- The Massachusetts Department of Environmental Protection (MassDEP) should issue guidance outlining the process for watershed permits for nutrient loads;
- MassDEP should designate Nitrogen Sensitive Areas;
- MassDEP should eliminate regulatory language establishing the presumption that Title 5 systems meet state water quality (WQ) standards; and
- The Commonwealth should seek delegated authority under the Clean Water Act to issue and enforce National Pollutant Discharge Elimination System (NPDES) permits.

The 208 Plan Update recognized that additional direct support of local wastewater planning was needed, and recommended that local planning efforts should consult with the CCC early in the process. The Updated 208 Plan recommended that the CCC implement the following measures under support:

- Assign watershed teams to support community planning efforts;
- Advise on the development of watershed scenarios with plans consistent with the 208 Plan Update;
- Provide a detailed evaluation of effluent disposal options;
- Establish criteria for eligible pilot projects, and identify opportunities to implement pilot projects across Cape Cod;
- Evaluate the steps required for a regional or locally based nitrogen impact fee;

- Develop a process or provide guidance to manage disagreement among parties;
- Provide a local public participation process with efforts specifically designed to reach environmental justice communities; and
- Coordination and further discussion with Joint Base Cape Cod and MassDevelopment.

The Updated 208 Plan makes the following recommendations regarding cost:

- The CCC should develop a proposal for a Cape Cod Capital Trust Fund for financing infrastructure design and construction;
- The CCC should develop a proposal for a Septic Trust Fund;
- MassDEP should exercise its discretion in providing principal forgiveness up to 25%;
- The Commonwealth should make available the Environmental Bond Bill money for monitoring programs and pilot projects to Cape Cod for efforts consistent with the Updated 208 Plan;
- The United States Environmental Protection Agency (USEPA) should expand the funding and piloting efforts of the Southeast New England Plan (SNEP); and
- Local watershed management plans that are consistent with the Updated 208 Plan should qualify for existing and potential revenue sources.

Specific recommendations to Orleans from the Plan published in 1978 included: (a) Title 5 enforcement in areas with difficult soils; (b) consideration of a regional septage treatment with Eastham and Brewster; (c) determination of the landfill plume; and (d) a coordinated land use analysis with Brewster to determine watershed protection needs. In the 208 Plan Update, the CCC identified a number of alternative technologies that should be considered to reduce nitrogen loadings from wastewater on the Cape, in addition to the consideration of traditional sewerage, treatment, and effluent discharge approaches.

Purpose of Amended Comprehensive Wastewater Management Plan (ACWMP)

An amended CWMP is being prepared which incorporates by reference relevant aspects of the previous CWMP not modified as a result of the additional planning and engineering effort through the existing scope of work. It is not intended that the ACWMP will represent a re-issuance of the previously published CWMP.

Design Status

Over the last few years, the Town of Orleans has prepared various documents with regards to the planning and preliminary design of both traditional and non-traditional technologies.

The Town has prepared a Preliminary Design Report (25% Design) for the Downtown Area collection system and WWTF. This includes the following:

- Evaluation of collection system technologies: (a) Gravity Sewers (GS); (b) Low Pressure Sewers (LPS); (c) Septic Tank Effluent Gravity (STEG); (d) Septic Tank Effluent Pumping (STEP); and (e) Vacuum Sewers (VS).
- Evaluation of wastewater treatment facility processes: (a) Conventional Activated Sludge ("CAS"); (b) Sequencing Batch Reactor ("SBR"); (c) Integrated Fixed Film Activated Sludge ("IFAS"); (d) Membrane Bioreactor ("MBR"); and (e) Rotating Biological Contactor ("RBC").
- Obtaining topography survey, conditioning subsurface investigations and cultural resource evaluations.

The Town is currently monitoring two non-traditional technologies demonstration projects (Aquaculture and Permeable Reactive Barriers) and is in the design stages of a demonstration project for Nitrogen Removing Barriers. The goal of using non-traditional technologies is to minimize the proposed sewerage footprint (area of Town and number of properties to be sewerage) to the greatest extent possible by maximizing the use of several the non-traditional technologies.

▪ **General Rationale for Using DBO Delivery Process**

The use of an alternative delivery process such as Design-Build (DB) and Design-Build-Operate (DBO) typically yields a cost savings that result in a net benefit to the residents of a community.

Therefore as part of the preparation of the Amended Comprehensive Wastewater Management Plan, the Town is evaluating potential options for alternative delivery such as Design-Build (DB) and Design-Build-Operate (DBO). These delivery methods can result in substantial savings as compared to a traditional design-bid-build project. Capital cost savings can average 21 percent and O&M savings can be an additional 5 to 7 percent, based on data obtained from recent AECOM DB and DBO projects.

▪ **Schedule for implementation under DBO Process**

A preliminary schedule for implementation of the project components using a Design-Build-Operate (DBO) is shown on the following table.

Description	Estimated Date
RFQ/RFP Funding Appropriation	October 2017
RFQ/RFP Development	October 2017 thru January 2018
Procurement	January 2018 thru April 2018
Implementation Funding Appropriation	May 2018
Implementation	2018 thru 2023

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